FEDERAL AVIATION AGENCY
Washington 25, D.C.

TECHNICAL STANDARD ORDER

Regulations of the Administrator

Part 514

Subject: INDIVIDUAL FLOTATION DEVICES TSO-C72

Technical Standards Orders for Aircraft Materials, Parts and Appliances

Part 514 which contains minimum performance standards and specifications for materials, parts, and appliances used in aircraft consists of two subparts. Subpart A contains the general requirements applicable to all Technical Standard Orders. Subpart B contains the technical standards and specifications to which a particular product must conform.

ANY TECHNICAL STANDARD ORDER MAY BE OBTAINED BY SENDING A REQUEST TO FAA, WASHINGTON 25, D.C.

Subpart A—GENERAL

§ 514.0 Definition of terms.

As used in this part:

(a) "Administrator" means the Administrator of the Federal Aviation Agency or any person to whom he has delegated his authority in the matter concerned.

(b) "FAA" means Federal Aviation Agency.

(c) "Manufacturer" means a person who controls the design and quality of an article produced under the TSO system, including all parts thereof and processes and services related thereto obtained from outside sources.

(d) "Article" means the materials, parts, or appliances for which approval is required under the Civil Air Regulations for use on civil aircraft.

§ 514.1 Basis and purpose.

(a) *Basis.* Section 601 of the Federal Aviation Act of 1958, and §§ 3.18, 4a.31, 4b.18, 5.18, 6.18, 7.18, 10.21, 13.18, and 14.18 of this title (Civil Air Regulations).

(b) *Purpose.* (1) This part prescribes in individual Technical Standard Orders the minimum performance and quality control standards for FAA approval of specified articles used on civil aircraft,[1] and prescribes the methods by which the manufacturer of such articles shall show compliance with such standards in order to obtain authorization for the use of the articles on civil aircraft.

(2) The performance standards set forth in the individual Technical Standard Orders are those standards found necessary by the Administrator to assure that the particular article when used on civil aircraft will operate satisfactorily, or accomplish satisfactorily its intended purpose under specified conditions.

§ 514.2 TSO authorization.

(a) *Privileges.* No person shall identify an article with a TSO marking unless he holds a TSO authorization and the article meets the applicable TSO standards prescribed in this part.

(b) *Letters of acceptance issued prior to July 1, 1962.* An FAA letter of acceptance of a statement of conformance issued for an article prior to July 1, 1962, is an authorization within the meaning of this part and the holder thereof may continue to manufacture such article without obtaining an additional TSO authorization, but shall comply with the requirements of § 514.3 through § 514.10.

(c) *Application.* The manufacturer or his duly authorized representative shall submit an application for a TSO authorization together with the following documents (See Appendix A of this subpart for sample application) to the Chief, Engineering and Manufacturing Branch, Flight Standards Division, in the region in which the manufacturer is located.[2]

(1) A statement of conformance certifying that the applicant has complied with the provisions of Subpart A and the article meets the applicable performance standards established in Subpart B of this part (See Appendix B of this subpart for sample statement of conformance);

(2) Copies of the technical data required in the performance standards set forth in Subpart B of this part for the particular article;

(3) A description of his quality control system in the detail specified in § 1.36 of this title (Civil Air Regulations). In complying with this provision the manufacturer may refer to current quality control data filed with the Agency, as a part of a previous application.

NOTE: When a series of minor changes in accordance with § 514.5 is anticipated, the manufacturer may set forth in his application the basic model numbered article with open brackets after it to denote that suffix change letters will be added from time-to-time e.g., Model No. 100 ( ).

(d) *Issuance.* (1) Upon receipt of the application and adequate supporting documents specified in paragraph (c) of this section to substantiate the manufacturer's statement of conformance with the requirements of this part and his ability to produce duplicate articles in accordance with the provisions of this part, the applicant will be given an authorization to identify his article with the applicable TSO marking.

(2) If the application is deficient in respect to any requirements, the applicant shall, upon request by the Chief, Engineering and Manufacturing Branch, submit such additional information as may be necessary to show compliance with such requirements. Upon the failure of the applicant to submit such additional information within 30 days after the date of the request therefor, his application will be denied and he will be so notified by the Chief, Engineering and Manufacturing Branch.

NOTE: The applicant will be issued an authorization or notified of the denial of his application within 30 days after the date of receipt of such application or, in the event that additional information has been requested, within 30 days after the date of receipt of such additional information.

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[1] Articles may also be approved and manufactured for use on civil aircraft as a part of the type design of a type certificate for an aircraft engine or propeller.

[2] Regional Offices are located at New York, Atlanta, Kansas City, Fort Worth, Los Angeles, Anchorage.

§ 514.3 Conditions on authorizations.

The manufacturer of an article under an authorization issued under the provisions of this part shall—

(a) Manufacture such article in accordance with the requirements of Subpart A and the performance standards contained in the applicable TSO of Subpart B of this part;

(b) Conduct the required tests and inspections, and establish and maintain a quality control system adequate to assure that such article, as manufactured, meets the requirements of paragraph (a) of this section and is in a condition for safe operation;

(c) Prepare and maintain for each type or model of such article a current file of complete technical data and records in accordance with § 514.6; and

(d) Permanently and legibly mark each such article with the following information:

(1) Name and address of the manufacturer,

(2) Equipment name, or type or model designation,

(3) Weight to the nearest tenth of a pound,

(4) Serial number and/or date of manufacturer, and

(5) Applicable Technical Standard Order (TSO) number.

§ 514.4 Deviations.

Approval for a deviation from the performance standards established in Subpart B may be obtained only if the standard or standards for which deviation is requested are compensated for by factors or design features which provide an equivalent level of safety. A request for such approval together with the pertinent data shall be submitted by the manufacturer to the Chief, Engineering and Manufacturing Branch of the Region in which the applicant is located.

§ 514.5 Design changes.

(a) *By Manufacturer*—(1) *Minor changes.* The manufacturer of an article under an authorization issued pursuant to the provisions of this part may make minor design changes to the article without further approval by the FAA. In such case the changed article shall retain the original model number and the manufacturer shall forward to the Chief, Engineering and Manufacturing Branch such revised data as may be necessary for compliance with § 514.2(c).

(2) *Major changes.* If the changes to the article are so extensive as to require a substantially complete investigation to determine compliance with the performance standards established in Subpart B, the manufacturer shall assign a new type or model designation to the article and submit a new application in accordance with the provisions of § 514.2(c).

(b) *By persons other than the manufacturer.* Design changes to an article by a person other than the manufacturer who submitted the statement of conformance for such article are not eligible for approval under this part, unless such person is a manufacturer as defined in § 514.0 and applies for authorization under § 514.2(c).

NOTE: Persons other than a manufacturer may obtain approval for design changes to a product manufactured under a TSO pursuant to the provisions of Part 18 or the applicable airworthiness regulations.

§ 514.6 Retention of data and records.

(a) A manufacturer holding an authorization issued pursuant to the provisions of this part shall, for all articles manufactured under such authorization on and after July 1, 1962, maintain and keep at his factory:

(1) A complete and current technical data file for each type or model of article which shall include the design drawings and specifications. This technical data shall be retained for the duration of his operation under the provisions of this part.

(2) Complete and current inspection records to show that all inspections and tests required to ensure compliance with this part have been properly accomplished and documented. These records shall be retained for at least two years.

(b) The data specified in paragraph (a)(1) of this section shall be identified and copies transferred to the FAA for record purposes in the event the manufacturer terminates his business or no longer operates under the provisions of this part.

§ 514.7 Inspection and examination of data, articles or manufacturing facilities.

The manufacturer shall, upon request, permit an authorized representative of the FAA to inspect any article manufactured pursuant to this part, and to observe the quality control inspections and tests and examine the manufacturing facilities and technical data files for such article.

§ 514.8 Service difficulties.

Whenever the investigation of an accident or a service difficulty report shows an unsafe feature or characteristic caused by a defect in design or manufacture of an article, the manufacturer shall upon the request of the Chief, Engineering and Manufacturing Branch, report the results of his investigation and the action, if any, taken or proposed by him to correct the defect in design or manufacture (e.g., service bulletin, design changes, etc.). If the defect requires a design change or other action to correct the unsafe feature or characteristic, the manufacturer shall submit to the Chief, Engineering and Manufacturing Branch, the data necessary for the issuance of an airworthiness directive containing the appropriate corrective action.

§ 514.9 Noncompliance.

Whenever the Administrator finds that a manufacturer holding an authorization issued pursuant to the provisions of this part has identified an article by a TSO marking and that such article does not meet the applicable performance standards of this part, the Administrator may, upon notice thereof to the manufacturer, withdraw the manufacturer's authorization and, where necessary, prohibit any further certification or operation of a civil aircraft upon which such article is installed until appropriate corrective action is taken.

§ 514.10 Transferability and duration.

An authorization issued pursuant to the provisions of this part shall not be transferred and is effective until surrendered, or withdrawn, or otherwise terminated by the Administrator.

APPENDIX A

SAMPLE APPLICATION FOR TSO AUTHORIZATION

_____
(Date)

(Addressed to: Chief, Engineering and Manufacturing Branch, Federal Aviation Agency, Region.)

Application is hereby made for authorization to use the Technical Standard Order procedures.

Enclosed is a statement of conformance for the article to be produced under TSO-C_____.

The required quality control data [1] are transmitted: (herewith) (under separate cover).

Signed _____

APPENDIX B

SAMPLE STATEMENT OF CONFORMANCE

_____
(Date)

(Addressed to: Chief, Engineering and Manufacturing Branch, Flight Standards Division, Federal Aviation Agency.)

The undersigned hereby certifies that the article listed below by model, type or part number has been tested and meets the performance standards of Technical Standard Order C_____. In addition, all other applicable provisions of Part 514 of the Regulations of the Administrator have been met.

The technical data required by the TSO in the quantity specified are transmitted: (herewith) (under separate cover).

Authorization to use TSO identification on this article is requested.

Signed _____

[1] Reference may be made to data already on file with the FAA.

§ 514.78 Individual flotation devices - TSO-C72.

(a) Applicability. Minimum performance standards are hereby established for individual flotation devices for use on civil aircraft of the United States. New models of individual flotation devices manufactured on or after the effective date of this section shall meet the standards specified in the Federal Aviation Agency Standard, "Individual Flotation Devices",1/ dated July 15, 1963.

(b) Marking. The markings specified in § 514.3(d) shall be shown except that the weight need not be included.

(c) Data requirements. In addition to the data specified in § 514.2, the manufacturer shall furnish to the Chief, Engineering and Manufacturing Branch, Flight Standards Division, Federal Aviation Agency, in the region in which the manufacturer is located, the following technical data:

(i) Six copies of the descriptive information on the device;

(ii) Six copies of the manufacturers' equipment operating instructions and limitations;

(iii) Six copies of the applicable installation instructions indicating any restrictions or other conditions pertinent to installation;

(iv) One copy of the manufacturers' test report; and

(v) One copy of the manufacturers' special cleaning and maintenance instructions.

(d) Effective date. December 9, 1963.

1/Copies may be obtained upon request addressed to Publishing and Graphics Branch, Inquiry Section, HQ-440, Federal Aviation Agency, Washington, D.C., 20553

9/11/63

July 15, 1963

Federal Aviation Agency Standard

for

Individual Flotation Devices

1.0 Purpose. To specify minimum requirements for individual flotation devices other than life preservers defined in TSO-C13c.

2.0 Scope. This standard defines the minimum requirements for individual flotation devices intended for use in civil aircraft engaged in operations over water not farther than 50 miles from land as required by the Civil Air Regulations. (Note: Individual flotation devices are not suitable substitutes for life preservers.) Dress covers which envelop flotation devices are not considered to be part of the device.

2.1 Types and Description of Devices. This standard provides for the following two categories of individual flotation devices:

a. Inflatable types (compressed gas inflation)
b. Noninflatable types

2.1.1 Description of Inflatable Types. Inflation shall be accomplished by release of a compressed gas contained in a cartridge into the inflation chamber. The cartridge shall be activated by a means readily accessible and clearly marked for its intended purpose. The flotation chamber shall also be capable of oral inflation in the event of failure of the gas cartridge.

2.1.2 Description of Noninflatable Types. Seat cushions, head rests, arm rests, pillows or similar aircraft equipment are eligible as flotation devices under this standard provided they fulfill minimum requirements for safety and performance. Compression through extended service use, perspiration and periodic cleaning shall not reduce the buoyancy characteristics of these devices below the minimum level prescribed in this standard.

2.2 Instructions for Use. Where the design features of the device relative to its purpose and proper use are not obvious to the user, clearly worded instructions shall be provided. These instructions shall be visible under conditions of emergency lighting.

3.0 Definitions. The following are definitions of terms used throughout the standard:

a. Buoyancy. The amount of weight a device can support in fresh water at 85° F. (air which may be entrapped in dress covers or envelopes shall be excluded from buoyancy consideration).

b. Flame Resistant. Not susceptible to combustion to th point of propagating a flame beyond safe limits after the ignition source is removed.

c. Corrosion Resistant. Not subject to deterioration or loss of strength as a result of prolonged exposure to a humid atmosphere.

4.0 General Requirements.

4.0.1 Materials and Processes. Materials used in the finished product shall be of such quality which experience and tests have demonstrated to be suitable for the use intended throughout the service life of the device. The materials and processes shall conform to specifications selected or prepared by the manufacturer which will insure that the performance, strength and durability incorporated in the prototype are continued or exceeded in subsequently produced articles.

4.0.2 Fungus Protection. Materials used in the finished product shall contain no nutrient which will support fungus growth unless such materials shall be suitably treated to prevent such growth.

4.0.3 Corrosion Protection. Metallic parts exposed to the atmosphere shall be corrosion resistant or protected against corrosion.

4.0.4 Flame Resistance. All materials used in the device, including any covering, shall be flame resistant.

4.0.5 Temperature Range. Materials used in the construction of the device shall be suitable for the intended purpose following extended exposures through a range of operating temperatures from -40° F. to $+140^{\circ}$ F.

4.1 Design and Construction.

4.1.1 General. The design of the device, the inflation means if provided, and straps or other accessories provided for the purpose of donning by the user shall be simple and obvious thereby making its purpose and actual use immediately evident to the user.

4.1.2 Miscellaneous Design Features. The devices shall be adaptable for children as well as adults. They shall have features which enable the users to retain them when jumping into the water from a height of at least 5 feet. Attachment straps shall not pass between the user's legs for retention or restrict breathing or blood circulation.

5.0 Performance Characteristics.

5.0.1 Buoyancy. The device shall provide not less than 14 pounds of buoyancy in fresh water at 85° F. for a period of 8 hours. For noninflatable types allowance shall be made so that the effects of compression through extended service use shall not reduce buoyancy below the minimum required.

5.0.2 Utilization. The devices shall be capable of being utilized by the intended user with ease.

5.0.3 Function Under Temperature Limits. The device shall be functional within the temperature limitations of -40° F. to +140° F.

6.0 Standard Test Procedures.

6.0.1 Salt Spray Test Solution. The salt used shall be sodium chloride or equivalent containing on the dry basis not more than 0.1 percent of sodium iodide and not more than 0.2 percent of impurities. The solution shall be prepared by dissolving 20 ± 2 parts by weight of salt in 80 parts by weight of distilled or other water containing not more than 200 parts per million of total solids. The solution shall be kept free from solids by filtration, decantation, or any other suitable means. The solution shall be adjusted to be maintained at a specific gravity of from 1.126 to 1.157 and a PH of between 6.5 and 7.2 when measured at a temperature in the exposure zone maintained at 95° F.

6.0.2 Flame Resistance. Three specimens approximately 4 inches wide and 14 inches long shall be tested. Each specimen shall be clamped in a metal frame so that the two long edges and one end are held securely. The frame shall be such that the exposed area of the specimen is at least 2 inches wide and 13 inches long with the free end at least ½ inch from the end of the frame for ignition purposes. In the case of fabrics, the direction of the weave corresponding to the most critical burn rate shall be parallel to the 14-inch dimension. A minimum of 10 inches of the specimen shall be used for timing purposes, and approximately 1½ inches shall burn before the burning front reaches the timing zone. The specimen shall be long enough so that the timing is stopped at least one inch before the burning front reaches the end of the exposed area.

The specimens shall be supported horizontally and tested in draft free conditions. The surface that will be exposed when installed in the aircraft shall face down for the test. The specimens shall be ignited by a Bunsen or Tirrell burner. To be acceptable, the average burn rate of the three specimens must not exceed four inches per minute. Alternatively, if the specimens must not support combustion after the ignition flame is applied for 15 seconds or if the flame extinguishes itself and subsequent burning without a flame does not extend into the undamaged areas, the material is also acceptable.

7.0 Test Requirements.

7.0.1 Buoyancy Testing. Tests shall be performed to substantiate that the device will provide the minimum buoyancy specified in section 5.0.1.

7.0.2 Salt Spray Testing. All metallic operating parts shall be placed in an enclosed chamber and sprayed with an atomized salt solution for a period of 24 hours. The solution shall be atomized in the chamber at a rate of three quarts per 10 cubic feet of chamber volume per 24-hour period. At the end of the test period, it shall be demonstrated that the parts operate properly.

7.0.3 Flame Resistance Testing. Tests shall be performed on nonmetallic materials in accordance with section 6.0.2 to substantiate adequate flame resistant properties.

7.0.4 Extreme Temperature Testing. Tests shall be performed to demonstrate that the device is operable throughout the temperature range specified in paragraph 5.0.3. In performing these tests, preconditioning of test specimens shall be accomplished to simulate conditions of immediate use of the device following an aircraft takeoff.

NOTE: An acceptable procedure for preconditioning may involve storage of the device for 8 hours at the extreme temperatures specified, followed by exposure to room temperature conditions for a period of time not to exceed 10 minutes.